

CLAIMS:

1. A method of charging a drill hole extending between a mouth  
5 thereof at a surface, and a blind end or bottom thereof remote from the mouth,  
the method including

providing in the drill hole at a relatively low level toward said bottom a  
lower layer of a blasting substance, and a lower layer of a plunger material  
proximately above the lower layer of blasting substance;

10 providing in the drill hole at a relatively high level remote from said  
bottom a higher layer of a plunger material, spaced a predetermined distance  
above said lower layer of plunger material, and proximately above said higher  
layer of plunger material, a higher layer of a blasting substance;

placing initiators in association with the respective layers of blasting  
15 substances and connecting the initiators to a controller for actuating the  
initiators at predetermined time intervals.

2. A method of charging a drill hole as claimed in Claim 1, in which  
the spacing between opposing surfaces of respectively said lower layer of  
20 plunger material and said higher layer of plunger material is between about 0,5  
m and about 3 m.

3. A method of charging a drill hole as claimed in Claim 1 or Claim 2  
in which the respective layers of plunger material are flowable material allowing  
25 placement in the drill hole at the respective desired positions.

4. A method of charging a drill hole as claimed in any one of Claim 1  
to Claim 3 inclusive, including tamping the drill hole proximate its mouth.

30 5. A method of charging a drill hole as claimed in any one of Claim 1  
to Claim 4 inclusive in which said relatively low level is spatially adjacent a

bottom of the drill hole and spaced above the bottom by a predetermined distance.

6. A method of charging a drill hole as claimed in Claim 5 in which the spacing between said relatively low level and the bottom is between about 0,5 m and about 3 m.

7. A method of charging a drill hole as claimed in Claim 5 or Claim 6, including supporting in each respective case the layer of plunger material and the layer of blasting substance on a plug capable of being positioned in the drill hole at a predetermined level.

8. A method of charging a drill hole as claimed in any one of Claim 5 to Claim 7 inclusive, including providing plunger material below the lower layer of blasting substance to provide a lower composite layer, providing plunger material above the higher layer of blasting substance to provide a higher composite layer, and providing one or more further composite layers of blasting substance and plunger material in the drill hole, with spacings in-between, in series along the drill hole.

9. A method of charging a drill hole as claimed in any one of Claim 1 to Claim 4 inclusive, in which the lower layer of blasting substance is positioned proximate and is supported on the bottom of the drill hole.

10. A method of blasting a drill hole charged in accordance with any one of Claim 1 to Claim 9 inclusive by actuating the initiators by means of the controller.

11. A method of blasting a drill hole as claimed in Claim 10 which includes actuating the initiators at time intervals to initiate the respective blasting substances simultaneously.

12. A method of blasting a drill hole as claimed in Claim 11 which includes actuating the initiators in a way selected from electrically, electronically, or pyrotechnically.

5 13. A method of mining including blasting an array of drill holes, each in accordance with any one of Claim 10 or Claim 12.

14. A charged drill hole extending between a mouth thereof at a surface, and a blind end or bottom thereof remote from the mouth, including  
10 within the drill hole,

a lower layer of a blasting substance at a relatively low level toward said bottom, and a lower layer of a plunger material proximately above the lower layer of blasting substance;

a higher layer of a plunger material at a relatively high level remote from  
15 said bottom, and spaced a predetermined distance above said lower layer of plunger material, and proximately above said higher layer of plunger material, a higher layer of a blasting substance;

initiators placed in association with the respective layers of blasting substances and having connectors for connection to a controller for actuating  
20 the initiators at predetermined time intervals.

15. A charged drill hole as claimed in Claim 14 in which the spacing between opposing surfaces of respectively said lower layer and said higher layer of plunger material is between about 0,5 m and about 3 m.

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16. A charged drill hole as claimed in Claim 14 or Claim 15 in which the respective layers of plunger material are flowable material allowing placement in the drill hole at the respective desired positions.

30 17. A charged drill hole as claimed in any one of Claim 14 to Claim 16 inclusive, including tamping material closing the drill hole proximate its mouth.

18. A charged drill hole as claimed in any one of Claim 14 to Claim 17 inclusive in which said relatively low level is spatially adjacent a bottom of the drill hole and spaced above the bottom by a predetermined distance.
- 5 19. A charged drill hole as claimed in Claim 18 in which the spacing is between about 0,5 m and about 3 m.
20. A charged drill hole as claimed in Claim 18 or Claim 19 in which, in each respective case, the layer of plunger material and the layer of blasting  
10 substance is supported on a plug positioned in the drill hole at a predetermined level.
21. A charged drill hole as claimed in any one of Claim 18 to Claim 20 inclusive, including plunger material provided below the lower layer of blasting  
15 substance to form a lower composite layer, plunger material provided above the higher layer of blasting substance to form a higher composite layer, and one or more further composite layers of blasting substance and plunger material, with spacings in-between, in series along the drill hole.
- 20 22. A charged drill hole as claimed in any one of Claim 14 to Claim 17 inclusive, in which the lower layer of blasting substance is proximate the bottom and is supported on the bottom.
23. A blasting operation including an array of blast holes each in  
25 accordance with any one of Claim 14 to Claim 22 inclusive.
24. A method of charging a drill hole substantially as herein described and illustrated.
- 30 25. A method of blasting a drill hole substantially as herein described and illustrated.

26. A charged drill hole, substantially as herein described and illustrated.

27. A blasting operation, substantially as herein described and  
5 illustrated.